

MOD-01 • SOS PROGRAM

Space Debris Management

A blockchain platform that lets space agencies, researchers and the public track orbital debris together — in one shared, transparent ledger.



// 01 – THE PROBLEM

A crowded, dangerous orbit

Human-made debris orbits Earth at such speed that even a small fragment can disable a satellite or damage a crewed spacecraft.

22,000objects $\geq$ 10 cm (softball)**500,000**objects $\geq$ 1 cm (marble)**100M**objects $\geq$ 1 mm (pen tip)**6,300 t**

total mass • 2,700 t in LEO

Impact on spacecraft

- ▶ The ISS cupola window was struck by debris on 10 June 2012
- ▶ 45 shuttle window impacts were severe enough to require replacement
- ▶ A Hubble panel returned to Earth showed more than 70 impacts
- ▶ ~170 million particles are too small to be tracked at all

Collision log

- 1996** French satellite hit by fragments of a rocket that exploded a decade earlier
- 2007** Anti-satellite test on Fengyun-1C adds 3,000+ trackable pieces
- 2009** Defunct Russian satellite destroys an active Iridium satellite — 2,000+ new pieces
- 2012** ISS cupola window strike

// 02 – TRACKED IN SILOS

Many watchers, no shared view

Debris is monitored by agencies around the world, each with its own sensors and records. Data moves slowly between them — and collisions keep creating new fragments.

Who tracks debris today

NASA ODPD

US DoD

NORAD

UK DERA

ESA • ESOC

TIRA

Goldstone

Haystack

EISCAT

Cobra Dane

IADC

UN COPUOS • UNOOSA

IADC members include NASA, ESA, JAXA, Roscosmos, CNSA, CSA, KARI, ISRO and NSAU.

Why cleanup is hard

- ▶ Destroying debris only creates more debris
- ▶ Nets fail at such high relative velocities
- ▶ Large objects like rocket stages need propulsion to be moved
- ▶ Removal missions (CleanSpaceOne, ESA e.Deorbit) still face unsolved capture problems — tentacles, nets, harpoons and robot arms are all on the table
- ▶ Every collision multiplies the number of fragments

INSIGHT Before debris can be removed, it has to be seen — by everyone, from one source of truth.

// 03 – THE SOLUTION

One ledger for every object in orbit

01

Debris dashboard

Every tracked particle listed in one place, from 10 cm down to 1 mm.

02

Debris explorer

Click any object to see its path and trajectory.

MARKET OPPORTUNITY

\$2.7B

space debris removal industry

03

Multi-agency input

Agencies contribute their own tracking data to a common record.

04

Selective privacy

Each entity chooses what to share and what to keep private.

Benefits

- ✓ A single platform for all agencies
- ✓ Public tracking, anytime
- ✓ Transparency across agencies
- ✓ Faster access to information
- ✓ Debris records digitised on-chain
- ✓ Consolidated research and effort

05

Open to the public

Anyone can view the data — and contribute observations.

06

Smart-contract alerts

Agencies warn each other automatically of collision risks.